

Reflections on the life of Robbie Robinson

Professor R.E. 'Robbie' Robinson (1929–2016)

Robbie Robinson was born on 6 November 1929 in Bloemfontein, brother to older sister Margaret (Peggy), who passed away in December 2014, and surviving younger sister Barbara. He was the product of an impoverished family struggling to survive – he was six when the breadwinner, his father, died from war wounds and the family remained uncompensated. He attended Grey College Bloemfontein (briefly) and then St Andrew's College, Bloemfontein. In 1940/1941, the family moved to Johannesburg and Robbie enrolled at St John's College on a music scholarship. He matriculated in 1945.

His first job, possibly as a volunteer, was between school and university. He taught maths and science at Rosettenville Primary School.

In 1946, he obtained a bursary from the Municipality of Johannesburg to attend Wits, initially for the first year in the faculty of science, and then he switched to Chemical Engineering for the second year.



His working life

After graduating (*cum laude*) and being awarded the Raikes Memorial Prize for the best student in 1950, Robbie joined the Government Metallurgical Laboratory as a research officer. His research work was concerned with the extraction of uranium from gold mining residues. The US Atomic Energy Commission commissioned a pilot plant on these promising results, which removed engineers from the lab and left Robbie to work alone on ion exchange resins. The problem was degradation of the resins, and this work led to Robbie registering for a higher degree. In 1953, a crisis at West Rand Consolidated Uranium plant occurred, with the resins degrading. Robbie was eventually recognized as having worked on this problem, and his solutions were successfully tested, solving the crisis. He was then left to type up and submit his thesis, which by then had been converted to a PhD, but this was to be 'top secret' under the Atomic Energy Act. So although the thesis was submitted to Wits, no copies were allowed in the Wits library, and all the work was lodged with the Atomic Energy Board. His PhD thesis was entitled 'The study of factors influencing the life cycle of synthetic anion exchange resins, with special reference to uranium'. It was never released and remains under lock and key to this day.

A closely guarded family secret is that after all six copies of the thesis had been painstakingly typed, they were left for final check on the laboratory bench. But that night a Johannesburg hailstorm blew out the windows of the lab, blew in the rain, and washed the ink off the thesis. A most serious girlfriend and shorthand typist, not yet Mrs Robinson, was recruited to retype this very secret work.

Robbie married Diane (née Lois Diane Allen) on 9 November 1955.

After the PhD, Robbie worked with Anglo American as head of the Chemical Engineering Division of their Central Metallurgical Laboratory. In 1959 he returned to the Government Metallurgical Laboratory (GML) as one of three specially selected chemical engineers who were seconded from industry to design the first uranium refining pilot plant.

In 1961 he was appointed under contract as director of the Extraction Metallurgy Division of the Atomic Energy Board. While Robbie held this onerous post, South Africa developed its ability to refine uranium to nuclear grade and to manufacture nuclear grade uranium metal and compounds. Uranium plants in South Africa adopted new processes based on solvent extraction and continuous ion exchange for the economic production of high-purity uranium. This work was included in the development of the Rossing uranium mine in Namibia.

While involved in this research, Robbie had management responsibilities as well. He became Chief Executive Officer of what is now Mintek, serving as Director of the GML from 1961–1966, and Director General of the National Institute for Metallurgy (NIM) from 1966–1976. It was under his direction in 1966 that the current Mintek logo was designed, and he also oversaw the move of NIM from Yale Road, Milner Park to the current Mintek campus in Randburg in 1976. The recruitment of scientific staff was a serious difficulty in the 1960s and 1970s. Two initiatives were started during this period that are indicative of Robbie's wide interests, particularly the development of people. He initiated the university research group scheme where the holders of scholarships from GML/ NIM formed research groups at universities. This not only promoted research, but gave much-needed assistance to university departments. The longer term problem of scientific staff shortage was addressed by the Phoenix Courses, in which selected teachers were made aware of the mining/metallurgical industry through a series of lectures, demonstrations, and visits to operating plants. This was then hopefully passed on to scholars.

In 1978 Robbie joined Sentrachem as Research Director. He helped Sentrachem to become one of the largest groups in the international agricultural chemical industry, and assisted with the substitution of imported agricultural chemicals with locally manufactured chemicals, which achieved self-sufficiency in the agricultural chemical industry by backwards integration in the manufacture of raw materials.

He actively promoted the agrochemurgy concept as an exciting and challenging opportunity for the country, and continued to advocate for scientists and other technical people to take the lead in developing these resources in South Africa.

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Robbie retired in 1989 and formed AC Mining, Consulting and Services (Pty) Ltd. He was appointed as Research Adviser to the Vice-Chancellor (Research) at Wits University and Honorary Professor of Chemical/Metallurgical Engineering. During this time he assisted with the attempt by Wits to establish a research facility at Frankenwald.

His consulting work was with Anglo American Research Laboratories, Chemeffco (a water treatment company), Debex (the research arm of De Beers), Boart, and JCI. Of particular interest to Robbie was the research on blasting systems and selective blast mining in an attempt to reduce discrepancies in the mine call factor.

INFACON

In 1974, Robbie was the Chairman of the Organizing Committee of the First International Congress on Ferro-Alloys (INFACON), and also established what is now the International Committee on Ferro-Alloys (ICFA) in a partnership between Mintek, the SAIMM, and FAPA (Ferro-Alloy Producers' Association). The INFACON series of conferences continues to thrive, and fourteen congresses have been held in twelve different countries. The next event, Infacon XV, is due to be held in South Africa (for the fourth time) in 2018.

SAIMM

Robbie joined the SAIMM in 1960 and became a member of the 50-year club in 2010. He served as President in 1975–1976. His Presidential Address was entitled 'The case for national research in mineral processing'. This was a fascinating piece of work because he presented it as a moment in court. In his style as an orator, who can forget his rich, resonant voice and his beautiful enunciation and diction! He asked those attending his Presidential Address to imagine that they were in a courtroom and proceeded to argue both the cases for and against investment in research, with views on research for research's sake. He then went on to identify the needs and benefits of research in the Minerals Industry.

He was awarded an Honorary Life Fellowship of the Institute in 1980 and the Brigadier Stokes Memorial Award (the SAIMM's highest award) in 1985.

In 1997, the SAIMM *Journal* was going the way of other publications of its kind, publishing high-quality research papers that were read by the enlightened few. The *Journal* was not getting enough material to be published monthly. Robbie agreed to serve as Editorial Consultant, which he did until 2000, when his sight and hearing deteriorated. He encouraged the inclusion of more practical and descriptive papers in the *Journal* and started his 'Journal Comments', which provided insightful comment on papers and a platform for many of his ideas. Today the *Journal* is one of the most read and respected publications in the minerals industry, with a wide variety of papers from all corners of the Earth. The 'Journal Comments' continue with the goals that Robbie set, and are contributed by respected professionals from all disciplines in the mining and minerals industry.

Interests

This full career in the minerals and chemical industries developed into a number of well-thought-out topics. The greatest tribute to, and the way to remember, Robbie would be to see these topics advanced. They formed the nucleus for a large number of his SAIMM Journal Comments over the years.

Research played a large part in his life and was no doubt a great love of his. He commented on the need for real innovative research and not just incremental improvements. He suggested the composition and selection of a research portfolio which he likened to a share portfolio of an investment company, where invariably it is recommended that one spreads the risk over a range of shares from high risk to low risk. He suggested that a 'Research and Evaluation Team' must comprise far more than a group of creative 'boffins'. It must include hard-headed pragmatists who can distinguish competence from wishful thinking and with experience in feasibility and cost evaluations. These views probably came from his practical experience of syndicated research when he was involved in the uranium Industry research and development that led to new technology and the building of 17 plants between 1946 and 1952. This work involved researchers in the USA, Canada, France, and the UK as well as South Africa. Robbie's view was, 'if a focused approach to uranium after the Second World War could achieve such results in such a short time, could a similar local syndicated research project not help to solve our problems of deep gold mining, which seems as if it will leave as much gold in the ground as has been mined to date?'

He was a proponent for the potential of the hydrogen age as a key factor in escalating the viability of the platinum industry in South Africa. He proposed as an additional application for the platinum fuel cell, a 'bipolar electrolysis cell'. This is a three-compartment cell with the anodic and cathodic compartments separated from the central feed compartment by anion-selective and cation-selective membranes respectively. The passage of an electric current separates a solution of an inorganic metal salt into an alkali and acid with the evolution of hydrogen at the anode and oxygen at the cathode. These two gases can be fed directly to a platinum fuel cell, which would generate most of the power required by the bipolar cell. It would also produce pure water in stoichiometric amounts. This would represent a most cost-effective way of producing alkalis and acids, with a host of applications in the electrodeposition of metals in hydrometallurgy, such as base and precious metals, (including nickel and cobalt in the platinum plants). It would also apply to water treatment, particularly the

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methods using mixed bed ion exchange resins. The acids and alkalis could be a low-cost means of regenerating the impurity-loaded resins. It represents also a method for producing acids and alkalis in industrial chemistry.

Improved recovery was a constant theme, with discourses on such items as the Kell process and the mine call factor (MCF). One possible reason for the MCF discrepancy is the loss of ultrafine gold particles carried away in the form of dust along with the explosion gases. Recovery of this gold through selective blast mining (SBM) could potentially harvest ore lying at depths below 5 km in the Witwatersrand conglomerates.

Mining clusters, particularly mining combined with agriculture, received a lot of his attention because this covered many things close to his heart: people, job creation, research to achieve a better standard of living as an outcome of these initiatives, and an improved environment with the reduction of acid mine drainage (AMD). All this would culminate in prosperous and productive multidisciplinary communities.

These ideas start with the bipolar cell treatment of acid mine water using ion exchange to provide cleaner agricultural-grade water and allows shared use of mine lands for farming purposes and improved irrigation incorporating hydroponics producing a range of crops from food to industrial raw materials. Research opportunities would include the investigation of the deterioration of the anion exchange membranes, which may be solved through research collaboration with the manufacturers of such membranes, as well as the recovery of metals such as cobalt from AMD.

His personal life

Robbie's personal life was no less hyperactive.

He was a competent sportsman who played really good cricket and hockey through school and university and into his 20s. He was quite proud of a trophy he was awarded for taking all 10 wickets in a cricket match. It is said by a school friend that he was 'an aggressive fast bowler, swinging the ball both ways, cutting it off the pitch, getting lift – unplayable at times!' He was also a good tennis player and league hockey player.

Music scholarship! This passion continued through his life, guitar playing and singing with friends and in the choir. Performances of Gilbert and Sullivan.

He was, sometimes to the irritation of his wife, an avid DIY enthusiast and woodworker and a disciple of Heath Robinson! He cut, sawed, and screwed together the contents for an entire household at their holiday house in the Eastern Cape ... all over a holiday season. He even made a plunge pool ... a new innovation in that region. He was a boat fixer, car fixer, plumber, and electrician ... though not always successfully so.

Another passion of his was photography: cameras, studio equipment to darkrooms. Robbie did nothing in half measures and he won a number of prizes and awards for his photography.

Robbie's children remember growing up with their lives frequently punctuated by entertaining on a massive scale. Diane would prepare and Robbie would arrive with or arrange for guests, politicians, overseas business people, and delegations to join the family for lunches, dinners, singsongs, charades, even the memorable occasion of entertaining 20 Japanese businessmen, who, newly arrived and without a word of English, were treated to a full Christmas Eve dinner in the middle of a typical Highveld thunderstorm. According to Robbie's son, Andrew, 'This entertainment was by no means restricted to business. Friends, neighbours, and their families were all part of a pattern of community activities that made growing up very special.'

Overall it might be said that his aim in life was to foster curiosity and develop those around him. This he did with abundance, both with his family and his career. He was a frequent and avid traveller.

It was difficult for him when his health deteriorated: his eyesight began to suffer from macular degeneration in about 1999, and then at the age of 70 he had a cochlear implant for deafness. Just prior to this he decided that he could not continue as Editorial Consultant to the *SAIMM Journal*. The SAIMM thought they had lost him! But the implant did the trick and he appeared at publications meetings and continued to contribute his insightful Journal Comments until a few months ago. He was recently interviewed by *Mining Weekly* to express his views on the needs of the mining Industry.

Robbie passed away on 21 January 2016 after a battle with cancer and he is survived by his wife Diane, children Michael in Melbourne, Andrew in Johannesburg, Chris in Sydney, and Jenny in Vancouver, and grandchildren Nicholas, Scott, and Jeremy in Melbourne, Claire, Nicole and William in Sydney, and Laura and Katie in Johannesburg.

This obituary has been compiled with input from a number of individuals and family members. It emphasizes how Robbie was part of a great family team and not just a mineral industry professional. We hope that Robbie 'the person' comes across in this obituary. He deserves all that is said about him. Robbie's enthusiasm, dedication, and insight have been an inspiration to many, and he will be sorely missed.

R.D. Beck